#9
02-26-02

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
(Case No. 98,766)
(NAL Case No. NAL-018)

In the Application of:	)	
	)	
Jianzhong Jiao	)	
Matthew Lekson	)	
	)	**Group Art Unit: 2875**
Serial No.: 09/513,040	)	
	)	**Examiner: J. Choi**
Filing Date: February 25, 2000	)	
	)	
For: TUBULAR LIGHT SOURCE REFLECTOR AND LIGHTING DEVICE	)	

Commissioner for Patents
Washington, DC 20231

DECLARATION PURSUANT TO 37 C.F.R. § 1.131

Dear Sir:

We, Jianzhong Jiao, residing at 22535 Fuller Drive, Novi, Michigan, 48374, and Matthew A. Lekson, residing at 23110 Cora Avenue, Farmington Hills, Michigan, 48336, hereby declare:

1. We are the named inventors on United States Patent Application Serial No. 09/513,040, filed on February 25, 2000.

2. The invention disclosed in the above-captioned patent application was conceived and reduced to practice prior to August 9, 1999.

3. Accompanying this Declaration is a photocopy of pages of our laboratory notebooks and design documentation illustrating a reduction to practice of our invention.

4. The invention was conceived and reduced to practice in the United States.

5. The date has been redacted from these photocopies; however the date is before August 9, 1999, the filing date of United States Patent No. 6,168,293.

6. We hereby declare further that all statements made herein of our own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Date: Feb. 7, 2002 Signed: Jianzhong Jiao

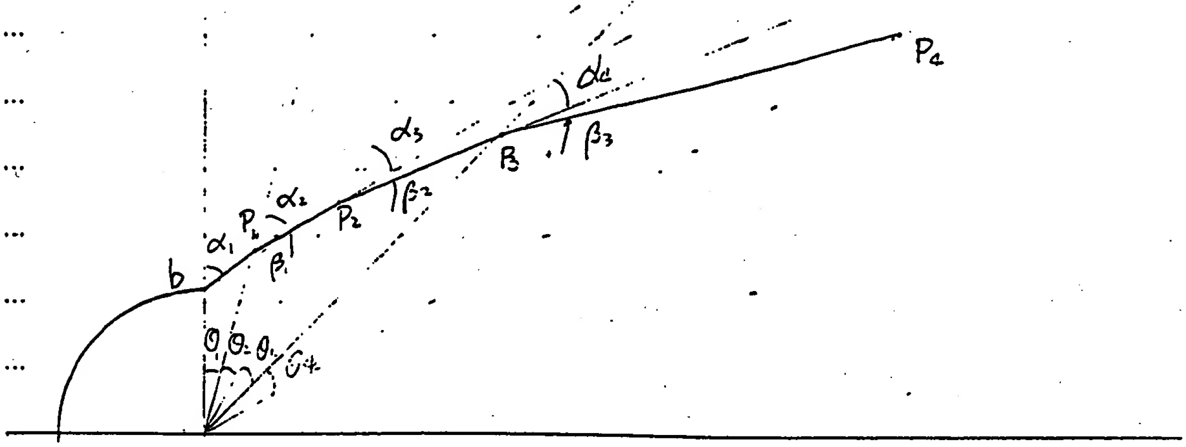
Jianzhong Jiao

Date: Feb 7, 2002 Signed: Matthew A. Lekson

Matthew A. Lekson

APPENDIX of DECLARATION PURSUANT TO 37 C.F.R. § 1.131

Case 1, 15



where $P_1 = (x_1, y_1)$

$P_2 = (x_2, y_2)$

$$y_1 = tg\left(\frac{\pi}{2} - \theta_1\right) x_1 = ctg\,\theta_1\, x_1$$

$$y_1 - b = tg\left(\frac{\pi}{2} - \alpha_1\right) x_1 = ctg\,\alpha_1\, x_1$$

$$x_1 (ctg\,\theta_1 - ctg\,\alpha_1) = b$$

$$x_1 \frac{\sin(\alpha_1 - \theta_1)}{\sin\alpha_1 \sin\theta_1} = b$$

$$x_1 \frac{\sin\alpha_2}{\sin\alpha_1 \sin\theta_1} = b$$

$$\therefore \begin{cases} x_1 = b\,\dfrac{\sin\alpha_1 \sin\theta_1}{\sin\alpha_2} \\[2ex] y_1 = \dfrac{x_1}{tg\,\theta_1} \end{cases}$$

ex: $\alpha_1 = 52.5^\circ$ $\theta_1 = 15$

$\alpha_2 = 37.5^\circ$

$\begin{cases} x_1 = 1.69 \\ y_1 = 6.29 \end{cases}$

2/ $$y_2 = ctg(\theta_1 + \theta_2)\, x_2 = \frac{x_2}{tg\, 2\theta_1}$$

$\theta_1 = \theta_2$

$$\frac{y_2 - y_1}{x_2 - x_1} = tg\left[\frac{\pi}{2} - (\theta_1 + \alpha_2 + \beta_1)\right]$$

$$= ctg(\theta_1 + \alpha_2 + \beta_1)$$

$$= ctg(\cancel{\theta_1} + \alpha_1 - \cancel{\theta_1} + \beta_1) = ctg(\alpha_1 + \beta_1)$$

$$y_2 - y_1 = ctg(\alpha_1 + \beta_1)(x_2 - x_1)$$

$$x_2\left[ctg\, 2\theta_1 - ctg(\alpha_1 + \beta_1)\right] = y_1 - ctg(\alpha_1 + \beta_1)\, x_1$$

$$x_2\, \frac{\sin(\alpha_1 + \beta_1 - 2\theta_1)}{\sin(\alpha_1 + \beta_1)\sin 2\theta_1} = y_1 - \frac{x_1}{tg(\alpha_1 + \beta_1)}$$

$$x_2\, \frac{\sin\alpha_3}{\sin(\alpha_1 + \beta_1)\sin 2\theta_1} = y_1 - \frac{x_1}{tg(\alpha_1 + \beta_1)}$$

$$\therefore \begin{cases} x_2 = \left(y_1 - \dfrac{x_1}{tg(\underbrace{\alpha_1 + \beta_1}_{60^\circ})}\right) \dfrac{\sin(\alpha_1 + \beta_1)\sin 2\theta_1}{\underset{30^\circ}{\sin\alpha_3}} \\[2ex] y_2 = \dfrac{x_2}{tg\, 2\theta_1} \end{cases}$$

$\begin{cases} x_2 = 4.6 \\ y_2 = 7.97 \end{cases}$

3) $y_3 = ctg(3\theta_1)\, x_3$

$$\frac{y_3 - y_2}{x_3 - x_2} = ctg(\alpha_3 + \beta_2 + 2\theta_1)$$

$$= ctg(\alpha_1 + \beta_1 - 2\theta + \beta_2 + 2\theta_1) = ctg(\alpha_1 + 2\beta_1)$$

$$y_3 - y_2 = ctg(\alpha_1 + 2\beta_1)(x_3 - x_2)$$

$$x_3 \left[ctg\, 3\theta_1 - ctg(\alpha_1 + 2\beta_1) \right] = y_2 - \frac{x_2}{tg(\alpha_1 + 2\beta_1)}$$

$$\therefore \begin{cases} x_3 = \left[y_2 - \dfrac{x_2}{tg(\alpha_1 + 2\beta_1)} \right] \dfrac{\sin(\alpha_1 + 2\beta_1)\sin 3\theta_1}{\sin \alpha_4} \\ y_3 = \dfrac{x_3}{tg\, 3\theta_1} \end{cases}$$

$\vdots$

$$\begin{cases} x_i = \left[y_{i-1} - \dfrac{x_{i-1}}{tg(\alpha_1 + (i-1)\beta)} \right] \dfrac{\sin(\alpha_1 + (i-1)\beta)\sin i\theta_1}{\sin \alpha_{i+1}} \\ y_i = \dfrac{x_i}{tg\, i\theta_1} \end{cases}$$

15

If $\theta_1 = \theta_2 = \cdots = \theta$

$\beta_1 = \beta_2 = \cdots = \beta$

$$\alpha_2 = \alpha_1 - \theta$$

$$\alpha_3 = (\alpha_2 + \beta) - \theta$$

$$= \alpha_1 + \beta - 2\theta$$

$$\alpha_4 = (\alpha_3 + \beta) - \theta$$

$$= \alpha_1 + 2\beta - 3\theta$$

1 $52.5°$
2 $37.5 + 7.5 = 45$
3 $30 + 7.5 = 37.5$
4

52.5
$+15$
67

$\vdots$

$$\alpha_i = \alpha_1 + (i-2)\beta - (i-1)\theta \qquad i \geq 2.$$

also

$$\alpha_1 = \left(\frac{\pi}{2} + \theta\right)/2$$

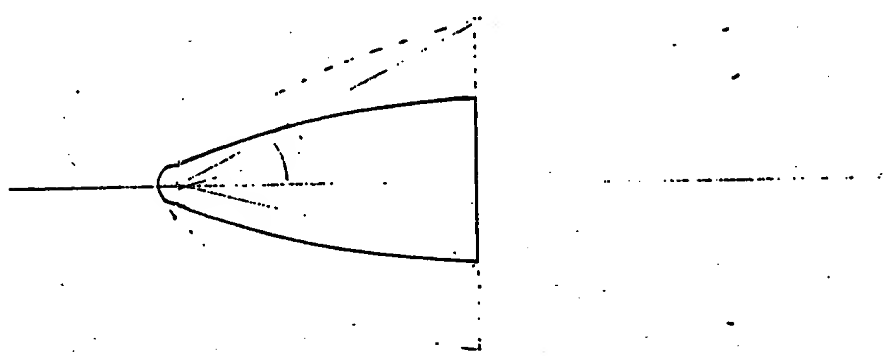
$$\beta = \frac{\theta}{2}.$$

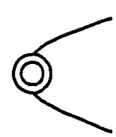
52.5000	0.8433	3.1470
37.5000	2.3038	3.9903
30.0000	5.1828	5.1828
22.5000	12.2627	7.0798
15.0000	40.0997	10.7446
7.5000	0.0000	0.0000

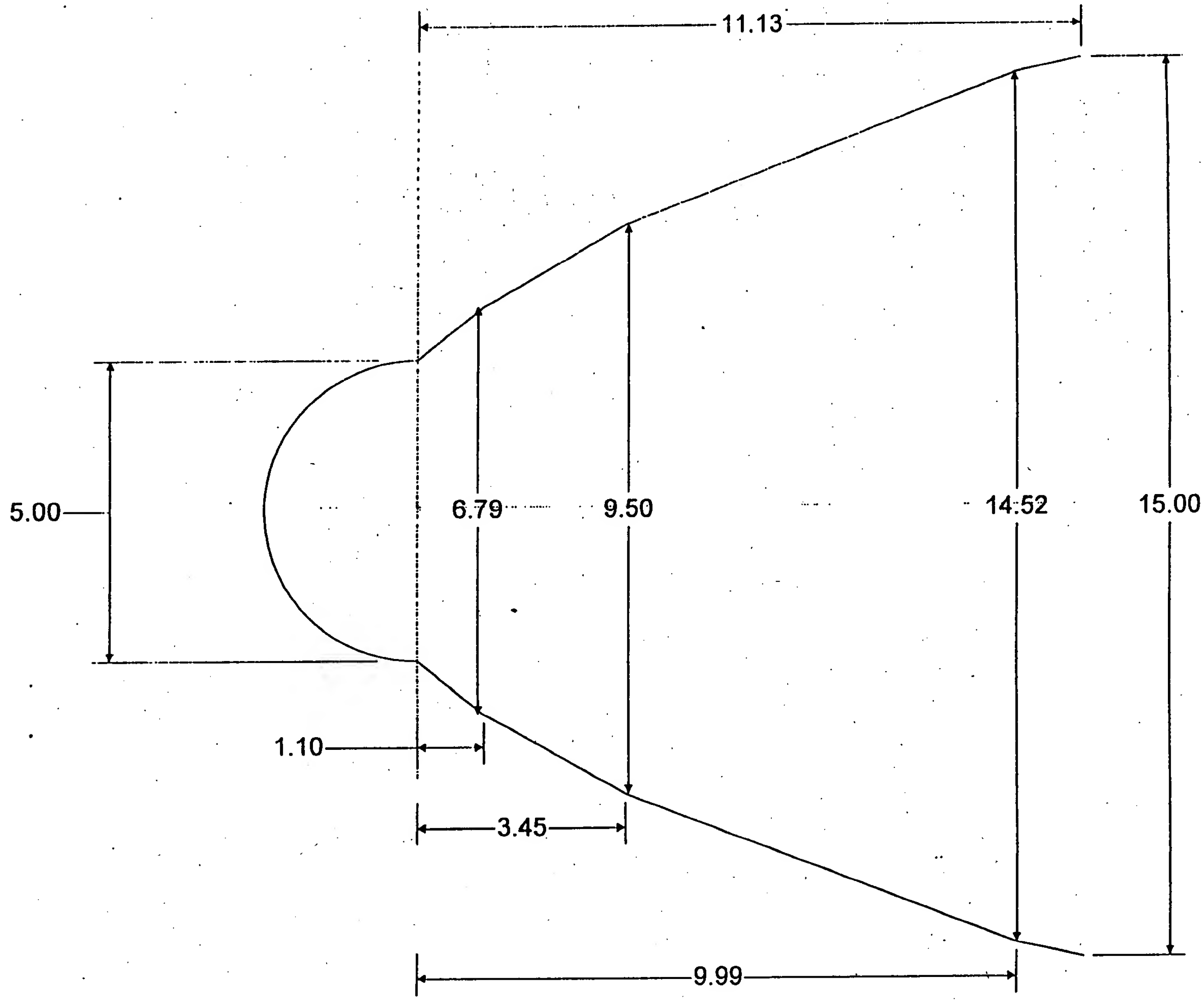
15° case.

R = 2.5 mm for the light source tube

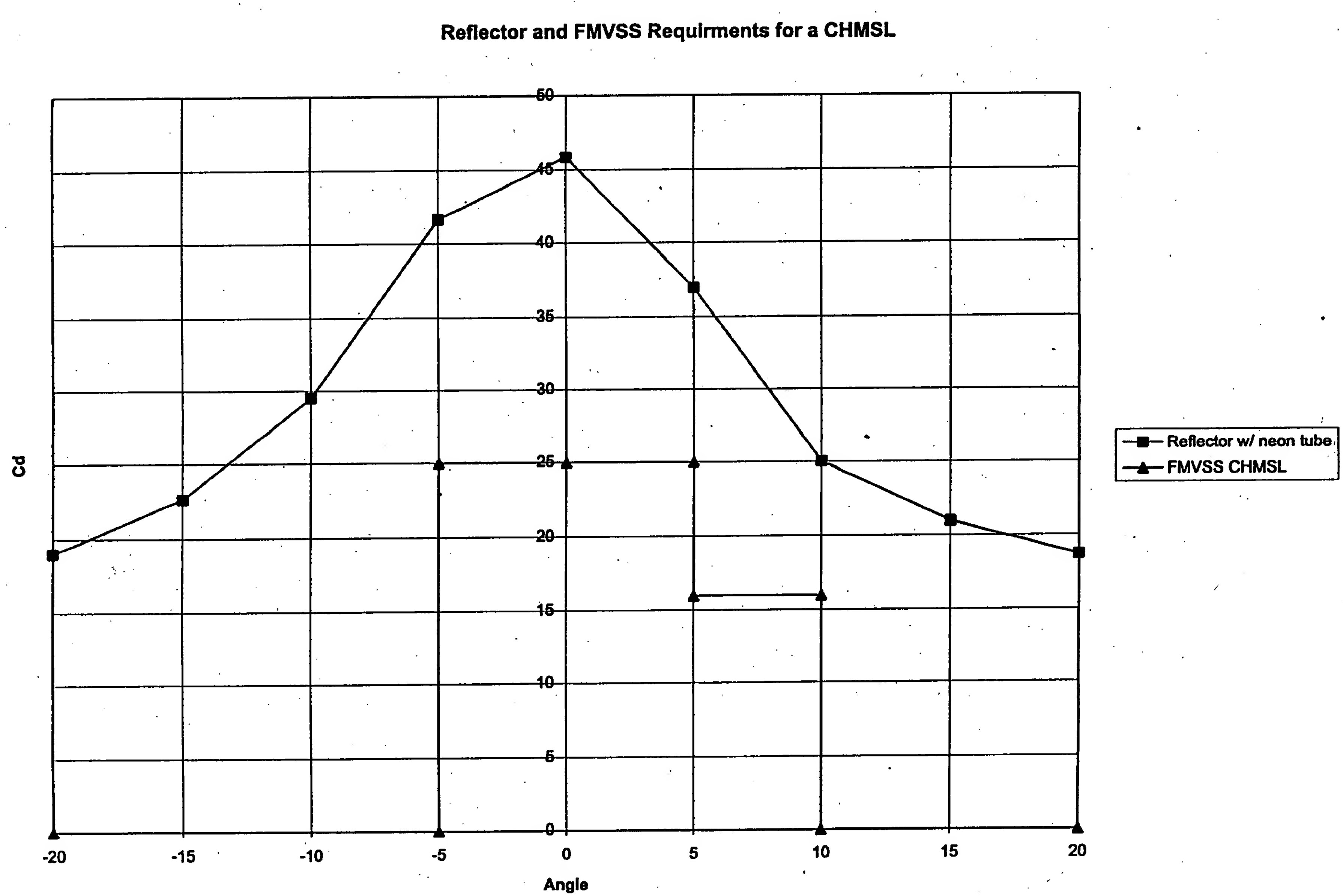
T = 10.7446 or D = 21.5 mm for the light pi







11.13
5.00
6.79
9.50
14.52
15.00
1.10
3.45
9.99


Reflector and FMVSS Requirments for a CHMSL
Cd
Angle
0
5
10
15
20
25
30
35
40
45
50
-20
-15
-10
-5
0
5
10
15
20
Reflector w/ neon tube
FMVSS CHMSL